TRIAL ON INTELLIGENT SPEED ADAPTATION IN GHENT, BELGIUM: THE RESULTS ON ACCEPTANCE AND DRIVING-BEHAVIOUR OF THE TEST-DRIVERS

Sven Vlassenroot, research fellow
Johan De Mol, research fellow
Centre for Sustainable Development - Ghent University
Poel 16, B-9000 Gent, Belgium
Tel. +32 9 264 82 09 – Fax +32 9 264 83 90
E-mail: sven.vlassenroot@ugent.be

SUMMARY

Over a year, 34 cars and 3 buses were equipped with the active accelerator pedal in the first ISA-trial in Belgium: 20 cars were voluntary users of the ISA-system, while 14 other vehicles and 3 buses were used by companies and public administrations. Some of the test-drivers could be considered as role-models. These role-models are important for an acceptance and future implementation of ISA. ISA was effective at reducing speeding behaviour and had an influence on attitudes about and perception of speed and speeding. The main results indicated that there is a carrying capacity and acceptance of ISA in Belgium.

PROJECT DISCRIPTION

Setting

Ghent initiated this ISA trial in a public-private partnership. Different partners participated in the trial by financing ISA-systems: the city council, the social service (OCMW), the province of East-Flanders, the public transport company 'De Lijn', the Belgian Institute for Traffic Safety (BIVV), the university of Ghent, the insurance company 'DVV' and the car manufacturer 'Volvocars Ghent.' 34 cars and 3 buses were equipped with the active accelerator pedal (AAP) or Limit Advisor from the Swedish company IMITA. When the driver attempted to exceed the speed limit, a resistance in the accelerator pedal was activated. If necessary, the driver could overrule the system by pressing on the accelerator pedal harder. The vehicles were equipped with a digital map containing all the current speed limits within the test area. The test area included the entire city of Ghent, which contained all legislated speed limits, 15 (pedestrian area), 30, 50, 70, 90 and 120.

The test-drivers

Ads were published in different media for recruiting drivers. Possible candidates could respond by letter to receive an application form. 108 drivers were retained as possible candidates. The drivers were selected on the following criteria: possibility of installation; equal number of males and females; spread out over different age-groups. According to these criteria, 80 candidates were first retained, mostly men. It was difficult to have equal age and gender groups because a low number of women had respond. 20 candidates were selected as test-drivers: 11 male and 9 female drivers. Also, not every selected driver was the only driver of the vehicle. The total number of voluntary drivers had been 28, spread over the 20 cars.

The company-cars, equipped with the active accelerator pedal, consisted of 6 cars of the City of Ghent (1 of the Social Services), 5 vehicles of the Ghent University, 3 buses of the regional public transport company, 2 vehicles of the Province of East-Flanders and 1 of Volvocars Ghent. The total (restricted) number of test drivers were 62: 42 male and 20 female spread over different ages.

OBJECTIVES AND METHOD

Objectives

The goals of the trial in Ghent were: to evaluate the effects of ISA on speed-change, traffic safety, drivers' attitude and behaviour and drivers' acceptance; to create a further carrying capacity of ISA and to create an acceptance of 'ISA as a potential for road-safety' by opinion and decision makers.

Evaluation of the effects of ISA

Data logging

All 37 vehicles were equipped with data-logging facilities and a flash-memory. This made it possible to register and save data among others on speed, speed limit, position, time and date, and voluntary use of the system outside the test area.

Questionnaires to the test drivers

All test-drivers were interviewed three times: before their vehicle was equipped with ISA, after driving with the system for 7 months and finally at the end of the test-period, after driving for 2 months with a deactivated pedal. The objective of the questionnaire was to study the drivers' attitudes, behaviour and experiences with ISA and possible changes after using the system for a certain period.

Creation of a further carrying capacity and acceptance of ISA as a potential for road safety

Questionnaires to the general public

The aim of the questionnaire (1) was to reveal the behaviour and attitudes on speed, use of traffic accommodation, opinions on measures of road safety, and acceptance of speed limits and ISA. Questionnaires were sent to 4820 randomly selected road users in Belgium. 2507 people answered.

Demonstration projects and drivers as role-model

The Centre for Sustainable Development organized different types of demonstration projects for opinion and decision makers. The main goal was to demonstrate the use and possible acceptance of ISA in road safety and to create a carrying capacity for a future implementation of ISA in Belgium and Europe.

Among the professional drivers there were test-drivers that could be considered as role-models. These drivers had a higher function at the council of Ghent, an institution or company and were chosen because they could have some influence on the general public, decision and opinion makers. The mayor and two aldermen of Ghent, the rector and vice-rector of the Ghent University, and the general manager of Volvocars Ghent were driving with ISA.

MAIN RESULTS

Evaluation of the effects of ISA

Basic attitudes

The drivers were asked to evaluate their basic attitudes before, during and after the project. The basic attitudes denote how drivers see mobility and transportation; in particular the perception of speed in relation to motorised vehicles. The basic attitudes were: 'driving is only satisfying with a nice car'; 'speeding is exciting'; 'drivers have to be too aware of other road users'; 'if I drive, I live it up'; 'driving fast saves time'; 'a car is only for use of transportation'; 'driving fast is liberating'; 'people should be stimulated to use the car less'; 'driving fast is fun'.

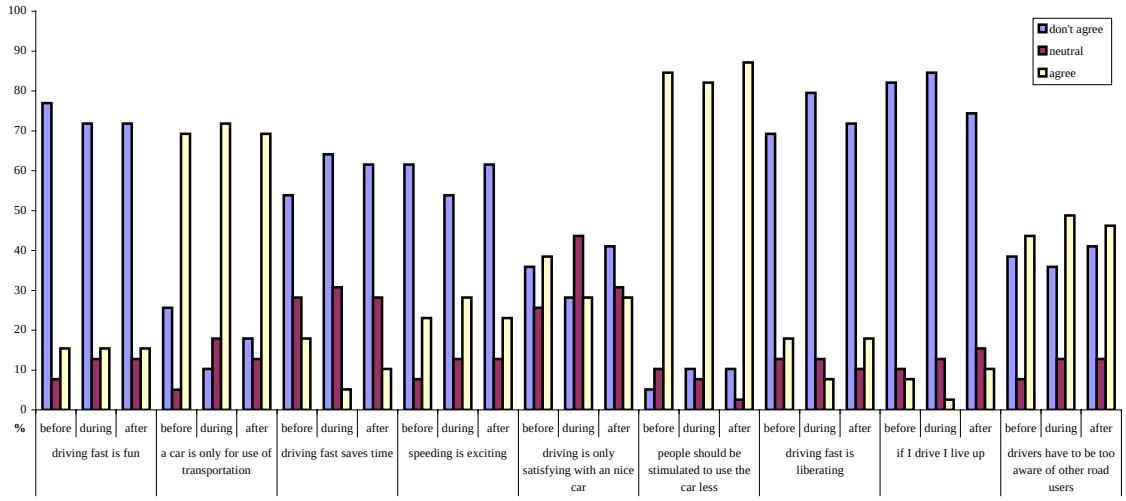

Figure 1: Frequencies of responses on basic attitudes in percentage.

ISA had a certain effect on the drivers' opinion on basic attitudes. Basically, most of the drivers didn't think that driving fast is fun (average, more than 70%), or exciting (average, more than 53%). Their opinions about these issues did not change dramatically during or after the trial. More people agreed on 'driving fast is liberating' during (79%) than before (69%) or after (71%). More than 75% did not agree with the attitude 'if I drive, I live it up', although this opinion increased (84%) during the trial and decreased (74%) after the trial. Before the trial 1 out of 5 drivers thought that 'driving fast saves time', during the trial only 5% were agree and after the trial, only 1 out 10 thought that 'driving fast saves time'. Before (84%), during (82%) and after (86%), a huge majority agreed that 'people should be stimulated to use the car less' and that 'a car is only a way of transportation' (around 70%). Before the trial, 38% thought that 'driving is only satisfying in a nice car'. During the test most of them (43%) were neutral, while after the trial most did not agree (41%). About the issue that 'drivers have to be too aware of other road users', an explicit opinion was not really given, although most agreed before, during and after.

Attitudes about, perception of and behaviour concerning speed and speeding

1) Attitudes about speed and speeding

The attitudes about speed and speeding were analysed before, during and after the trial. These particular attitudes could have an influence on the drivers' perception of speed and speeding. The following possible attitudes were given to the test-drivers: 'speeding is dangerous';

'speeding is sportive'; 'speeding is reckless'; 'speeding causes the most traffic accidents'. Although their opinions changed during and after the trial, most drivers thought that speeding is 'dangerous', 'reckless' and 'not sportive'. Most remarkable changes concerned their opinion of 'speeding causes the most traffic accidents': 74% agreed before, 69% during, and 56% after the trial.

2) Perception of speed limits

The test-drivers were asked how they felt about the different speed limits in different areas (highway (120 kph), outside urban (90 kph), urban (50 kph), 30 kph, pedestrian (15 kph)). On average, almost more than 60% of the drivers declared before, during and after that the speed limits are good in all areas. During and after the trial, more and more drivers claimed that speed limits in the 30-areas (23% before, 36% during, 41% after) and the pedestrian areas (82% before, 61% during, 51% after) are to low. Main reason was that with the AAP they had to uphold the speed limits in those areas. Most of the drivers said that 'driving 30 kph or 15 kph is slow', although they did not want to declare that 'the 30-areas and pedestrian areas are not useful for road-safety'.

3) Speeding behaviour

The test-drivers were asked to evaluate their speeding behaviour. Compared with their speeding behaviour before ISA, the test-drivers declared that they were driving slower during the project. On highways, the answer on 'never speeding' increased during the project with 49%, outside urban areas with 26%, in urban areas with 16%, in 30-areas with 7%. The answers on 'regular speeding and mostly speeding' decreased on most categories during the trial. The answers given after the trial on 'never speeding' stayed level for outside urban area, in urban area and 30 roads. On highways this answer decreased, although it should be noted only a small part of 120 routes were included in the test area, so it was assumed that the test-drivers used the AAP mostly voluntarily on highways. The drivers were also asked if they used the AAP manually (voluntarily) and on which roads. Mostly it was used on highways (56% during, 60% after) and outside urban area (56% during, 50% after), less in urban areas (46% during, 41% after) or 30-roads (33% during and after) outside the test area.

Driving behaviour with ISA

Based on the questionnaires, the following experiences were given by the drivers:

- 3 out of 5 drivers declared that they drove more comfortably and relaxed than without ISA.
- 1out of 3 drivers said that they had more consideration for other road-users.
- The drivers looked less often at the speedometer and they let their foot 'rest' relatively often on the counterforce of the accelerator pedal, even as some of them tried to drive in such way that the pedal would not be activated.
- Most drivers did not notice any difference while driving with or without the active accelerator pedal regarding looking at speed signs, recognition of and involvement in certain traffic situations or keeping distance with other cars. If they experienced some changes it was more in favour of driving with ISA.
- 1 out of 2 test-drivers declared that they overtook less while driving with ISA.
- 1 out of 2 drivers found it easier to keep a constant speed with ISA.
- The ISA-system assisted them well to maintain the right speed. Certainly for upholding the 30 kph limit of which they noted that it was not an easy speed to drive at without assistance.

Ergonomic aspects and technical issues

The drivers declared that the ISA-system is good, but certain technical issues could be better, like the position of the system in the car and the screen for reading the speed limit. Most problems they noted regarded the speed map: sometimes it was not very accurate.

Acceptance of ISA

The method used to measure the acceptance is the procedure of Van Der Laan, Heino and De Waard (2). Acceptance is measured by direct attitudes towards a system and provides research with a system evaluation in two dimensions. The technique consists of nine rating-scale items. These items load on two scales, a scale denoting the usefulness of the system, and a scale designating satisfaction.

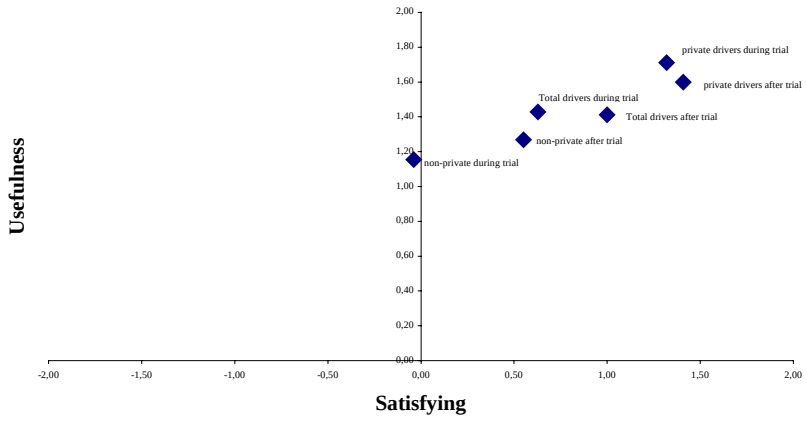

Figure 2: Acceptance of the active accelerator pedal

All drivers (total) accepted the active accelerator pedal. After the trial they regarded the pedal at even more satisfying. Most pleased with the active accelerator pedal were the private drivers. During the project they found it more useful but less satisfying than after the project. The most remarkable change is seen by the non-private drivers: while during the project they did not find it satisfying, although useful, they declared it was more satisfying and useful after the trial.

At the end of the trial, the private test-drivers could opt to keep the ISA-system in their car. 15 private car holders chose to keep the system in the vehicle after the test-period which is a significant indication that there is an acceptance of the active accelerator pedal.

The main reasons given for keeping the system was that it was assisting, comfortable and provided for more relaxed driving.

Creation of a further carrying capacity and acceptance of ISA as a potential for road safety

Questionnaires to the general public

The general results of the questionnaire to the general public were:

- most people indicated that they never drive faster than the legal speed limits in urban areas, when 1 out of 4 respondents indicate that they do drive faster on highways.
- 8 out of 10 people indicated that ‘speeding is dangerous’ and it is the ‘main cause of accidents in traffic’. Most of them felt unsafe (as a pedestrian or car driver) when other vehicles are speeding.
- The majority of the respondents accepted the legal speed limits. Most people did not assume that the speed limits should be higher or lower.

- 3 out 4 indicated that the government should do more about speed violations. Most of all they said that dealing with speed violations should be a priority.
- A large part of the respondents agreed with an implementation of ISA in all cars.

FUTURE INTENTIONS

The city of Ghent, according to their policy of increasing traffic safety, will go further with the implementation of ISA. First they will implement ISA in their own car fleet, but also they intend to negotiate with other companies and governmental administrations to enlarge the scale of ISA-cars. On demand of the federal minister of mobility a new ISA-trial should take place in Brussels in the nearby future. Cars of different cabinets, parliaments and ministries will be equipped with the active accelerator pedal. The main goal is to be role-models in traffic safety and to create further carrying capacity in Belgium and in Europe.

CONCLUSION

About the basic attitudes, most of the drivers did not think that driving fast is fun, liberating or exciting, before, during or after the project. Most drivers declared that speeding is dangerous, reckless and not sportive. Driving with ISA changed their behaviour on speeding: during the project, most of the drivers declared that they never drove faster on highways, outside urban areas, in urban areas and 30-zones. The drivers used the system voluntary on highways and outside urban areas , which gave a first indication of their acceptance of the active accelerator pedal. They also experienced the pedal as satisfying and useful. After the trial, the private test-drivers could choose to keep the ISA-system in their car. 15 private car holders chose to keep the system in the vehicle after the test-period which was a significant indication that there is an acceptance of the active accelerator pedal. The drivers noticed that the system assisted them well in upholding the speed limits and provided for comfortable and relaxed driving, although certain technical issues could be better.
The questionnaires to the test-drivers and the general public, indicated that there is a carrying capacity for ISA in Belgium. Also drivers in role-models like mayors, aldermen, CEO's, and members of parliament could have an influence on the general public as well as decision and opinion makers. Therefore the participation of role-models as ISA-drivers in different projects is important for the acceptance and implementation of ISA in Belgium and Europe.

REFERENCES

(1) De Mol, J., Broeckaert, M., Van Hoorebeeck, B., Toebat, W., Pelckmans, J., *Naar een draagvlak voor een voertuigtechnische snelheidsbeheersing binnen een intrinsiek veilige verkeersomgeving,* Centrum voor Duurzame Ontwikkeling/Universiteit Gent – BIVV: Gent, pp 274, 2001.

(2) Van Der Laan, J, Heino, A., De Waard, D., *A simple procedure for the assessment of acceptance of advanced transport telematics,* University of Groningen: Groningen, pp 1-10, 1996.

More information on: http://cdonet.ugent.be/onderzoek/ISA